

## CLAIMS

What is claimed is:

1. A semiconductor device structure comprising an oxidation barrier, said oxidation barrier comprising a doped metal or doped metal alloy layer co-deposited by electroless plating.
2. The semiconductor device structure of claim 1, wherein said doped metal or said doped metal alloy layer comprises at least one of platinum, rhodium, iridium, ruthenium, and palladium.
3. The semiconductor device structure of claim 1, wherein said doped metal or doped metal alloy layer is boron doped.
4. The semiconductor device structure of claim 3, wherein boron comprises about 0.1% to about 5.0% by weight of said doped metal or said doped metal alloy layer.
5. The semiconductor device structure of claim 1, wherein said doped metal or doped metal alloy layer is phosphorus-doped.
6. The semiconductor device structure of claim 1, wherein said doped metal or doped metal alloy layer has a thickness of about 500Å.
7. The semiconductor device structure of claim 1, wherein said doped metal or doped metal alloy layer has a thickness of about 100Å.
8. A method of forming an oxidation barrier comprising co-depositing a doped metal or doped metal alloy layer by electroless plating over a semiconductor substrate.

9. The method of claim 8, further comprising forming a conductive structure over said oxidation barrier.

10. The method of claim 8, further comprising forming a dielectric layer over said oxidation barrier.

11. The method of claim 8, wherein said co-depositing comprises introducing at least part of said semiconductor substrate into an aqueous metal solution comprising at least one metal salt and at least one reducing agent.

12. The method of claim 8, wherein said co-depositing comprises introducing at least part of said semiconductor substrate into an aqueous metal solution comprising at least one reducing agent and at least one of platinum, rhodium, iridium, ruthenium, and palladium.

13. The method of claim 8, wherein said co-depositing comprises introducing at least part of said semiconductor substrate into an aqueous metal solution comprising at least one metal salt and at least one of dimethylaminoborane, a borohydride, and hydrazine.

14. The method of claim 8, wherein said co-depositing comprises introducing at least part of said semiconductor substrate into an aqueous metal solution comprising at least one metal salt and at least one substance that alters a grain structure of a metal of said at least one metal salt.

15. The method of claim 8, wherein said co-depositing comprises forming an oxidation barrier comprising a boron-doped metal.

16. The method of claim 8, wherein said co-depositing comprises forming an oxidation barrier comprising a phosphorous-doped metal.

17. The method of claim 8, wherein said co-depositing comprises forming an oxidation barrier adjacent a conductive layer on said semiconductor substrate.

18. An electroless plating bath for depositing an oxidation barrier on a semiconductor device structure, said bath comprising at least one metal salt and at least one substance that alters a grain structure of a metal of said at least one metal salt.

19. The electroless plating bath of claim 18, wherein said at least one metal salt comprises a salt of at least one of platinum, rhodium, iridium, ruthenium, and palladium.

20. The electroless plating bath of claim 18, wherein said at least one substance that alters a grain structure of a metal of said at least one metal salt comprises at least one of dimethylamineborane, potassium borohydride, sodium borohydride, and hydrazine.

21. The electroless plating bath of claim 18, further comprising a complexing agent.